

PARASITES OF JAPANESE CRUSTACEA

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TWENTY-SIX FIGURES

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The parasites of littoral crustaceans are of particular interest in connection with the migrations of animals from the ocean into land and freshwater habitats. Some of them have been brought out of the sea, which was probably the original home of life, and others have attacked the invaders on the land.

During the summer of 1929 the writer studied the littoral animals at Aburatsubo, near Misaki, Japan. Grateful acknowledgments are made to Professor N. Yatsu and Mr. N. Yosii of the Marine Biological Station of the Imperial University of Tokyo, who did everything they could to make work at the station pleasant and profitable. In this paper a parasitic copepod (Crustacea, Copepoda, Harpacticoida, Ameiridae), an isopod (Crustacea, Isopoda, Bopyroidea, Bopyridae), a barnacle (Crustacea, Cirripedia, Rhizocephala, Sacculinidae), and a mite (Arachnida, Acarina, Mesostigmata, Parasitoidea, Parasitidae, Parasitinae) are considered. The first three came from the ocean, but the last is typically a parasite of land animals.

Cancrincola wilsoni, new species

Eighteen specimens, the type (Cat. No. 62834, U. S. Nat. Mus.) and the cotypes (62835-6), were collected at Aburatsubo, Japan, August 11, 1929 from the gills of the red land crab, *Sesarma haemotocheir* (de Haan). Other specimens were taken from the gills of the littoral crab, *Sesarma pictum* (de Haan). This species is named for Dr. C. B. Wilson, of the United States National Museum.

Female.—Body, slender; more than three and a half times as long as wide; cylindrical, tapering posteriorly. Cephalic segment, slightly longer than the two following segments combined; conical, with convex margins; rostrum, stout and rounded. Eye, far forward. First post-cephalic segment, about as long as second; wider than cephalon; fifth and sixth segments distinctly separated. First abdominal segment, wider and about as long as each of the two which follow it. All abdominal segments are armed on the lateral surfaces with a row of four to seven ctenidia, and on the thoracic segments there is one ctenidium on each side.

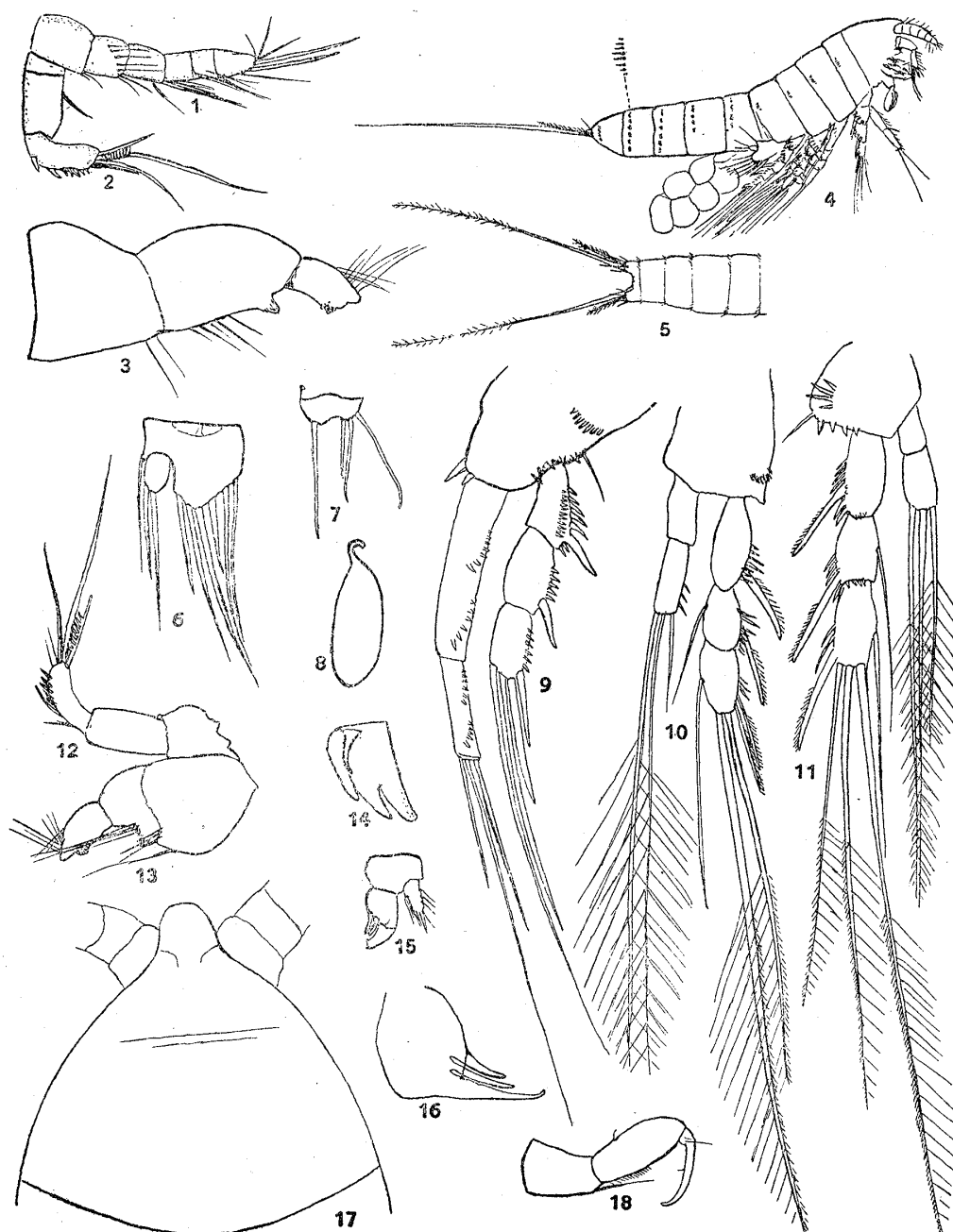
Anal laminae, shorter than terminal segment and stout; each armed with a small seta at the outer distal angle, another dorsal, and another near the inner distal angle. Each lamina bears a terminal seta which in different specimens is three-eighths to two-thirds as long as the entire body; the setae curve toward each other at their tips. Another seta is lateral to the terminal one and about one-seventh as long as it.

Anterior antennae 6-segmented; shorter than the cephalon, stout; the four terminal segments are setose on their ventral surfaces, and on the second segment there is an oblique row of setae. Posterior antennae 3-segmented; without exopodite; basal segment, twice as wide as long; second segment, longer than wide, bearing a seta at the end of the proximal third of its anterior surface; distal segment, about as long as second, armed with two stout spines proximally, a double row of teeth on anterior surface, and at the tip two long setae and two shorter setae, one of which has teeth along its proximal half.

Mandibles, simple, 1-segmented; with three blunt teeth on the cutting surface and a curved seta near base. First maxilla with a 1-segmented exopod which bears a number of setae distally; endopod, with three teeth, the distal one of which is broad and stout, the second slender, and the third small and delicate; basipod, 1-segmented, wider than long. Second maxilla, 1-segmented; terminated by three long curved teeth, the distal one of which is the longest. Maxillipeds, 3-segmented; with a stout basal segment which is longer than wide, tapers a little distally, and bears a slender seta near its postero-distal angle; second segment ellipsoidal, slender, palm with a double row of small setae and a small seta on opposite margin at end of proximal third; third segment

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Figs. 1—18. *Cancrincola wilsoni*. 1, first antenna, female; 2, second antenna; 3, first antenna, male; 4, female with egg case; 5, ventral view of male abdomen; 6, fifth foot, female; 7, fifth foot, male; 8, spermatophore; 9, first foot, female; 10, second foot, female; 11, fourth foot, male; 12, second antenna, male; 13, first antenna; 14, mandible; 15, first maxilla; 16, second maxilla; 17, cephalon of female, dorsum; 18, maxilliped.

forms a finger which makes a sub-chela with the second, curved, tapering near the tip.

First four pairs of swimming legs, biramous, spinulose; with endopods 2-segmented and exopods 3-segmented; all similar. First leg with exopod one-third as long as endopod, which is armed with spines along its lateral margin and bears two straight spines and two setae at the tip of its distal segment. The spines and setae are arranged as follows;—First exopod, XIX-0, VI-0, VIII-2; first endopod, XIII-0, XI-3; Second exopod, VII-0, VIII-1, V-3; second endopod, 0-0, III-3, Third exopod, XII-0, VIII-1, III-3; third endopod, 0-0, III-4; Fourth exopod, VIII-0, VI-1, III-5; fourth endopod, 0-0, 0-4. Fifth legs, uniramous, lamellar, 2-segmented, the basal segment with one seta at its lateral distal angle and six setae median to the second segment, which bears two setae.

Many females were carrying a single egg case, which contained from four to nine eggs.

Total length, without caudal setae, 0.63 to 0.73 mm.; width, 0.15 mm. at junction of second and third post-cephalic segments. Color, translucent, white.

Male.:—General form, similar to that of female.

Anterior antennae, 3-segmented, stout and fitted for clasping basal segment, wider than long, with three setae at inner distal angle; second segment, notched on its inner surface where a rough tubercle projects at the proximal angle, three setae along border of notch; third segment, twice as long as wide, bears a rough tubercle on inner surface at end of distal third, nine setae near tip on outer convex surface.

Swimming legs much like those of female. Fifth foot, lamellar, 1-segmented, much wider than long; along distal margin there is a long stout seta at the median side, a rounded notch, a short seta, and two long slender setae near the lateral margin. Spermatophore, elongate-ovate, a short thread at the small end.

Total length, without caudal setae, 0.58 to 0.66 mm.; caudal setae, 0.41 to 0.42 mm.

Sacculina sp.

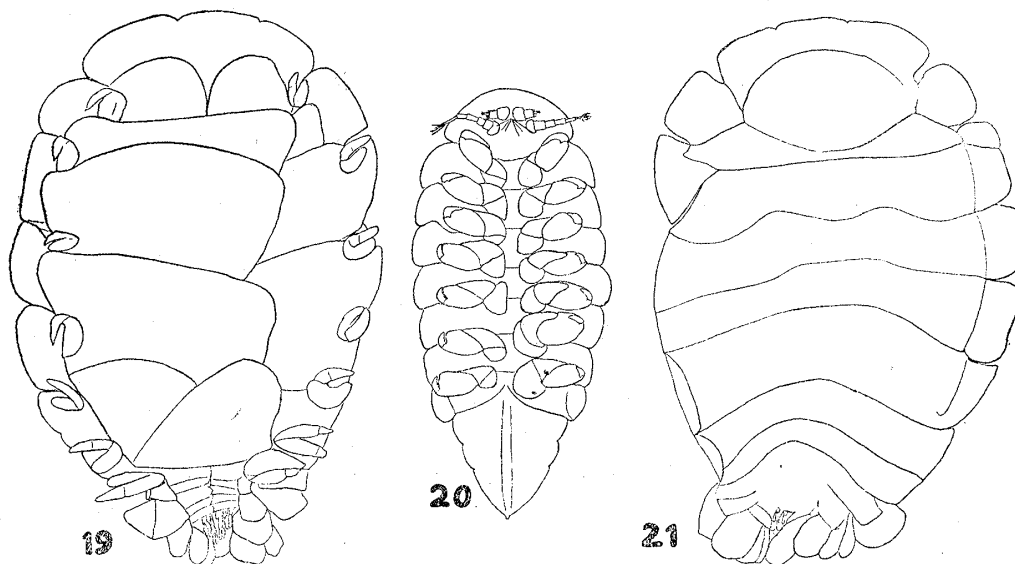
This parasite was quite common on *Pachygrapsus crassipes* Randall.

Specimens were sent to Dr. H. Boschma, University of Leiden, who is at present on an expedition to the East Indies, but has agreed to identify it when he returns to Holland.

Probopyrus yatsui, new species

A male and a female (Cat. No. 62832, U. S. Nat. Mus.) were taken from the branchial cavity of *Petrolisthes japonicus* de Haan at Aburatsubo (Misaki), Japan, August 15, 1929. The former was attached to the dorsal surface of the abdomen of the latter. These are here described. Later on the same day a slightly smaller pair was collected from the same host species (62833).

Body of *female*, 6.6 mm. in length and 4.39 mm. wide, bent slightly toward left posteriorly; white. Incubatory pouch filled with eggs, which measure 0.15 by 0.14 mm. Head, set into first free thoracic segment, rounded at anterior margin but a lamella projects forward from it which is only slightly arched on the anterior margin and is faintly divided into three lobes; posterior margin less convex than anterior; eyes, absent. Thoracic segments, distinct, seven in number;



Figs. 19—21. *Probopyrus yatsui*. 19, female, ventral view; 20, male, ventral view; 21, female, dorsal view.

the first two on the left side and the first five on the right bear lamellar epimera. Abdominal segments, poorly defined dorsally, but represented by soft ridges between the bases of the pleopoda on the ventrum. Uropoda, absent. Thoracic appendages, poorly segmented; obtuse at tips. Pleopoda form a graded series, the first being very broad with two large, lamellar rami and the fifth being more or less cylindrical with slender rami and small.

Male, 1.53 mm. in length, and 0.7 mm. wide at fourth free thoracic segment. Head, wider than long. All free thoracic segments are quite distinct and each bears a pair of stout legs which end in subchela. Abdomen, conical; all segments fused and only the first two indicated by lateral notches; median ridge on dorsum; minute rounded tooth at tip. Pleopoda, absent.

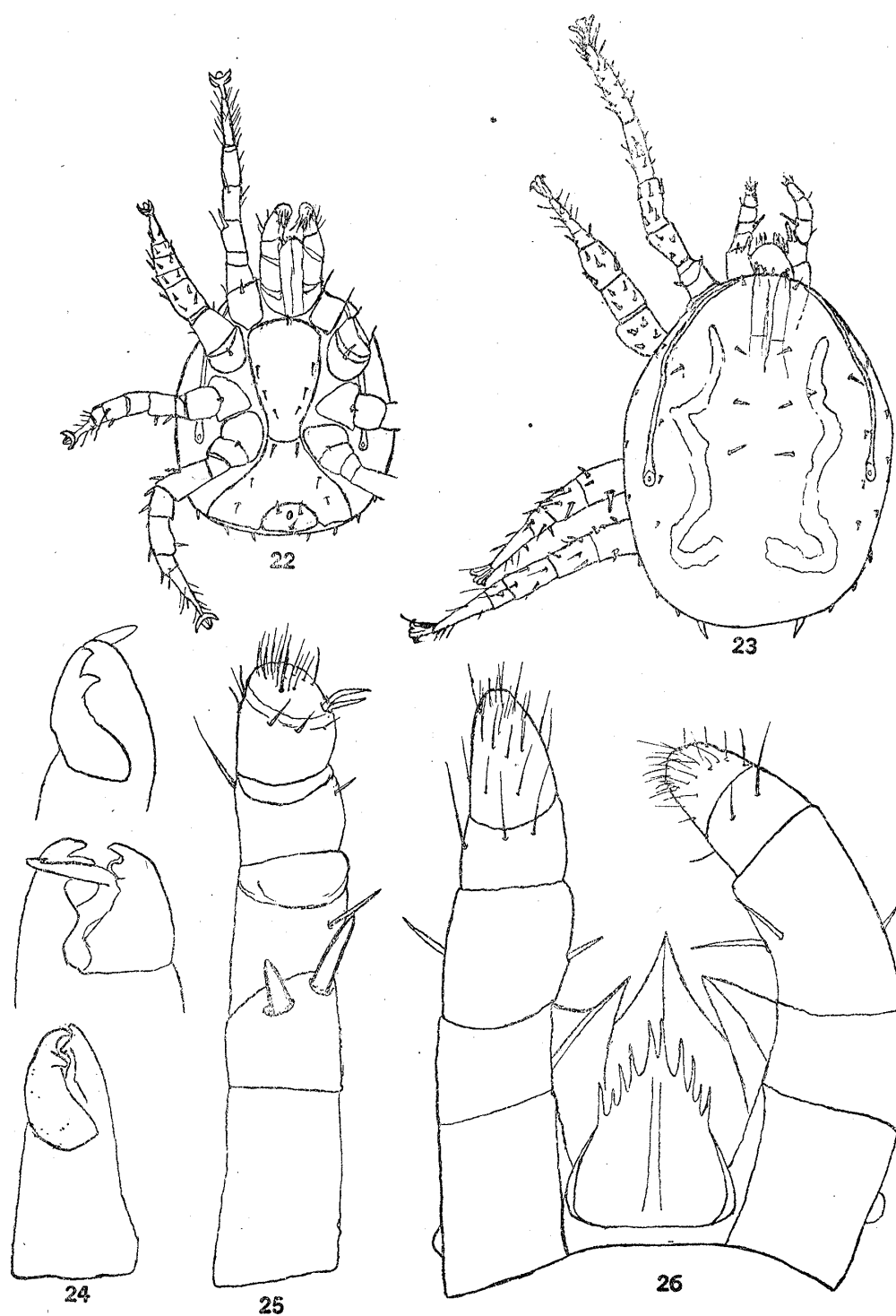
Named for Professor Naohide Yatsu.

Eulaelaps ewingi, new species

About eighty specimens (Cat. No. 62837, 62838 U. S. Nat. Mus.) were collected from the abdominal appendages of *Ligia exotica* Roux at Aburatsubo, Japan, August 16, 1929. It is named for Dr. H. E. Ewing of the United States Bureau of Entomology.

Body, flattened; setae on dorsal surface arranged in pairs as follows:—1 on anterior margin on either side of median line, 4 on either side of median line in anterior half of body, 4 along each side near lateral margin, 4 along posterior margin on each side, and five along lateral margin. On the ventral surface there are six pairs of small setae along the margins of the gentito-ventral plate, which extends from the camerosome to the posterior end of the body and is forked posteriorly and encloses the anal plate, which is wider than long and bears three setae, one median behind the anus and two lateral and anterior to it. Peritreme extends anteriorly from the two spiracles which are situated near the margins of the body near the spaces between the bases of the third and fourth legs.

Legs, setose distally, 8-segmented, with a pad and two claws at the distal end, the coxal segments of the three posterior pairs bear minute spines. Pedipalpi, 5-segmented, setose at tip, and bearing two



Figs. 22—26. *Eulaelaps ewingi*. 22, female, ventral view; 23, female, dorsal view; 24, tip of chelicera, from three different specimens; 25, pedipalp, ventral view; 26, pedipalpi and epistoma, dorsal view

large spines on the postero-median surface of the second segment. Chelicerae, usually completely retracted within the body; 2-segmented; the distal segment 1.5 times as long as the proximal, chelate; movable finger bears a long stout process which projects beyond the tip of the segment. Epistoma lies between bases of pedipalpi, partly enclosed in a groove; triangular; anterior border bears ten acuminate teeth. Below it are four conical processes which project ventro-medially and are joined to the bases of the pedipalpi.

Length of body, 0.47 mm., width, 0.33 mm.

Several nymphs were among those collected. These resembled the adults, but lacked the process on the movable finger of their chelicerae.

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